MIAMIBEACH

OFFICE OF THE CITY MANAGER

LETTER TO COMMISSION

028-2013

TO: Mayor Matti Herrera Bower and Members of the City Commission

FROM: Kathie G. Brooks, Interim City Manager

DATE: January 30, 2013

SUBJECT: **Extreme Tides and City Response**

The purpose of this LTC is to provide you with information on the extent of flooding during extreme seasonal tides and the efforts of the City to minimize its impacts.

BACKGROUND

Tides are primarily driven by the gravitational pull of the moon and sun. When the moon and sun are aligned during the moon's new and full phases, their gravitational pulls combine to produce higher tides called spring tides. The moon's gravitational pull is also greater when the moon is at its closest point to the earth, its perigee, which produces higher tides called perigean tides. These two astronomical events occur simultaneously several times per year and produce extreme tides called perigean spring tides or king tides.

Ocean storms and currents affect the tides by pushing water to the coast. Last October and November, Hurricane Sandy, followed by additional storms in middle of the Atlantic Ocean, coincided with perigean spring tides to produce exceptionally high tides.

Typical high tides in the City average about 0.3 feet. The perigean spring tides reach elevations around 1.6 feet. Last October and November, these high tides reached as high as 2.2 feet. (All elevations are based upon NAVD88, which is a vertical datum.)

The National Weather Service, a branch of the National Oceanographic and Atmospheric Administration (NOAA), predicts tidal elevations at its tidal stations. At a conference call with staff from NOAA, it was explained that these latest extreme tides were between 0.5 and 1.5 feet higher than the predicted tides because of the storms. NOAA staff further indicated that it was rather difficult to predict more than one week in advance when the tides will be higher than predicted. However, the City is providing more detailed topographic data to NOAA so that it can provide more specific flooding forecasts to the City.

FUTURE HIGH TIDES

The City will experience perigean spring tides again in April 2013 and November 2013. At this time, the NOAA predicted tides will not be as high as those experienced last October and November. However, the City will be working with staff from NOAA in the week leading up to the expected tides to more accurately forecast the high tides and to be better able to mitigate their impacts.

MITIGATION EFFORTS

Certain areas within the City begin to flood when the tide reaches an elevation of 0.5 feet. In some locations, there is nuisance flooding like ponding and birdbaths at the edge of the street. Other locations experience more severe flooding. These include:

- North Bay Road centered on 52nd Street and just north of 59th Street
- 5th Street intersections from West Avenue to Jefferson Avenue
- West Avenue from 6th Street to 9th Street
- 10th Street and Alton Road
- 14th Street and Alton Road
- Coconut Lane on Palm Island
- Sunset Harbour neighborhood

Staff has mapped the locations of tidal flooding in GIS (viewable on-line) and is developing short-term and longer term plans to reduce its impacts. The Florida Department of Transportation (FDOT) is also beginning work on three pump stations – at 5th Street and West Avenue, 10th Street and Alton Road, and 14th Street and Alton Road – in April 2013. This will relieve some of the worst flood-prone areas. The City is also planning to install check valves at other locations with low elevations. (Attached is a spreadsheet showing locations prone to flooding along with long-term and short-term mitigation efforts.)

Short-term mitigation efforts may include closing travel and parking lanes, installing temporary inflatable seals in drainage piping, and installing temporary pumping systems. Over the longer term, improvements proposed in the recent Stormwater Management Master Plan will also alleviate the extreme tidal flooding. Already, the City also has several projects in construction including capacity improvements to two pump stations in Sunset Harbour with the retrofit of a third pump station being advertised in the coming days. Star Island is also under construction, and a joint participation agreement is being negotiated with FDOT to provide for improvements to 59th Street and North Bay Road. FDOT will be beginning construction of three pump stations along the Alton Road corridor this April with the pumps located at the intersections of 5th Street and West Avenue, 10th Street and Alton Road, and 14th Street and Alton Road. Included in this project has been a discussion with FDOT about the need to prevent tidal and stormwater flooding on West Avenue during the Alton Road project as it will be the primary detour.

Should you have any questions or comments, please do not hesitate to contact me.

Attachment
Drainage Improvements Spreadsheet

KGB/JSG/RAB/JJF/RWS

F:\WORK\$ALL\(1) EMPLOYEE FOLDERS\Rick Saltrick\LTC's\LTC for Extreme Tides.docx

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
Drainage Improvements to Mitigate Extreme Tides

Location/Area	Flooding Frequency	Proposed Improvements	OWNER	Estimated Construction Completion	Interim Solution
3 ST & Michigan Ave	Rarely		CMB		Not feasible
4 ST & Michigan Ave	Occasionally	Will work with FDOT to install its designed vault with a check valve	FDOT-CMB	TBD	Installation of plugs during high tides - coordination with FDOT
5 ST & Michigan Ave	Occasionally	Construction of FDOT pump station	FDOT	Sep-13	Installation of plugs during high tides - coordination with FDOT
5 ST & Lenox Ave	Occasionally	Construction of FDOT pump station	FDOT	Sep-13	Installation of plugs during high tides - coordination with FDOT
5th Street (south side) west of Alton Road	Occasionally	Will work with FDOT to install its designed vault with a check valve - designed pending FDOT consent to award contract	FDOT	TBD	Installation of plugs during high tides - coordination with FDOT
5th Street and West Avenue	Occasionally	Construction FDOT pump station	FDOT	Sep-13	Will be under construction in April 2013
6 ST & Meridian Ave	Occasionally	Pump station as part of Flamingo Neighborhood Imp - 10G-6 St ROW Imps	CMB	Mid 2014	Installation of plugs during high tide
6 ST & West Ave	Frequently	Install check valve in a vault	CMB	2014	Working to address stormwater outfall from private property
8 ST & West Ave	Occasionally	Install check valve in a vault	CMB	2014	Working to address stormwater outfall from private property
10th Street of west street end	Frequently	Install check valve in a vault	CMB	Oct-13	Barricade Street
10th Street and Alton Road	Frequently	FDOT pump station	FDOT	Sep-13	Will be under construction in April 2013
11 ST & Michigan Ave	Rarely		CMB		None required
11th Street & West Avenue	Occasionally	Install check valve in a vault	CMB	Early 2013	None required as work will be completed before next extreme tide
14th Street and Alton Road	Frequently	FDOT pump station - will be under construction in April 2013	FDOT	Sep-13	Barricade Street
17th Street and Alton Road	Occasionally	To be improved with FDOT project - will be under construction in April 2013	FDOT	Apr-15	Installation of outfall plugs during high tide
Lincoln Road west street end	Rarely		CMB		None required
Lincoln Court at Collins Canal	Rarely		CMB		None required

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
Drainage Improvements to Mitigate Extreme Tides

Location/Area	Flooding Frequency	Proposed Improvements	OWNER	Estimated Construction Completion	Interim Solution
Bay Road at Collins Canal	Rarely	Raising seawall to 3.2' NAVD - to be constructed by City forces	CMB	Apr-13	None required as work will be completed before next extreme tide
Alton Road & Michigan Ave, NE corner	Occasionally	To be improved with FDOT project -will be under construction in April 2013	FDOT	Apr-15	Barricade lane
Purdy Avenue from Dade Blvd to 20 ST	Occasionally	Retrofit of 2 pump stations in Maurice Gibb Park and Marina. Contaminated soil found in Maurice Gibb Park may need to be mitigated.	CMB	Early 2013	None required as work will be completed before next extreme tide
20th Street	Occasionally	Retrofit of pump station on 20th Street to start June 2013	CMB	Nov-13	Not feasible as piping system has infiltration
Bay Road from 18 ST to 20 ST	Occasionally	Need to line existing piping - pending assessment of pipes and procurement of contractor	CMB	Mid 2013	None required as work will be completed before next extreme tide
West Ave from 18 ST to 20 ST	Occasionally	Need to line existing piping - Pending assessment of pipes and procurement of contractor	CMB	Mid 2013	None required as work will be completed before next extreme tide
Indian Creek Dr from 27 ST to 36 ST	Occasionally	Working with FDOT to add a pump station(s) in this location	FDOT	At least 2 years from commitment	Plugging during high tides pumping as best as possible (when possible)
Collins Ave & 43 Street	Rarely	FDOT will install a pump station at Indian Creek Dr & 43 ST	FDOT	Mar-15	None required
W 44 Street at Royal Palm Ave	Occasionally	Install in line check valve - ITB to be issued	CMB	Early 2013	None required as work will be completed before next extreme tide
46th Street and Royal Palm Avenue, north side of intersection	Rarely	Install in line check valve	CMB	Early 2013	None required as work will be completed before next extreme tide
52nd Street & North Bay Road	Occasionally	Propose to issue a change order to HA Contracting to expedite installation of check valve.	CMB	Apr-13	None required as work will be completed before next extreme tide
N Bay Road & 56 ST	Rarely	CIP Improvements La Gorce	CMB	Apr-15	
N Bay Road & 57 ST	Rarely	CIP Improvements La Gorce	CMB	Apr-15	

PUBLIC WORKS DEPARTMENT

ENGINEERING DIVISION

Drainage Improvements to Mitigate Extreme Tides

Location/Area	Flooding Frequency	Proposed Improvements	OWNER	Estimated Construction Completion	Interim Solution
59th Street & N Bay Road	Occasionally	Will execute a JPA with FDOT to design and construct 2 Check valves	FDOT/CMB	Jun-14	Deploy pump systems during extreme tides. To minimize impact but will not eliminate flooding until project completed
North Bay Road & La Gorce Drive	Rarely	Check valve in a vault - as part of La Gorce project	CMB	Early 2015	None required
Crespi Blvd from 79 to 86 Street	Rarely	CIP Improvements Biscayne Point Neigh.	CMB	May-13	None required
N Coconut Lane at Palm Ave	Occasionally	CIP Improvements Palm & Hibiscus Neigh.	CMB	Jun-14	Not feasible as piping system has infiltration
228 S COCONUT LN	Occasionally	CIP Improvements Palm & Hibiscus Neigh.	CMB	Jun-14	Not feasible as piping system has infiltration
Lower N. Bay Road	Rarely	CIP Improvements - Bayshore LNBR	CMB	TBD	Not feasible as piping system has infiltration

planning

design

in construction

Frequently = Flooding more frequently than perigean spring tide

Occasionally = Flooding in perigean spring tide

Rarely = Flooding in extreme perigean spring tide